

PISTILLODY OF THE PERIANTH IN TRILLIUM SESSILE.

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During the latter part of March, 1914, a considerable collection of the familiar *Trillium sessile*, var. *giganteum* H. & A., was found at the lower end of a small heavily shaded canyon in the Oakland Hills. Approximately sixty plants were in flower and an equal number of plants bore no flowers, or flowers exceedingly rudimentary in character. The mature flowers, with one exception, were all of them normally developed, and varied in color from a light violet to deep garnet. One plant, which in no way stood out from the rest by reason of any unusual vegetative development, at once attracted attention because of the abnormal flower which it bore. In this flower both corolla and calyx were green and fleshy; the color and texture of the six perianth segments being that which is ordinarily characteristic of the calyx of *Trillium*. These six similar segments were arranged in two whorls of three parts each. The outer whorl, representing the calyx, was characteristic in shape and size, while the inner whorl, representing modified petals, corresponded in shape to the calyx segments, but were somewhat shorter. They also exhibited a peculiar curling-in of their lower margins to form slender tubes, which extended for a distance of from 4 to 11 mm. up from their point of attachment on the receptacle. When the curled edges were rolled back the interior of the tubes that they formed were found to contain a number of small greenish-white bodies attached near the margins. The number was variable on the two curled edges of the same segment, and one modified petal bore only three, which were along one edge only.

The color and general appearance of these protuberances on the margins of the calyx-like petals suggested that they represented ovules. This supposition was to a certain extent confirmed by the fact that the flower contained only a minute rudimentary pistil, within which no structures resembling ovules were found. It is almost the rule that *Trillium sessile*, var. *giganteum* in the San Francisco Bay region produces no seed, or very little seed, but in the normal open flowers the ovary will uniformly show maturing ovules or unmistakable traces of them. (Fig. 6.)

The attached photograph was made two days after the abnormal flower had been collected, and in consequence the flower parts are somewhat withered. Three of the ovule-like bodies are discernible along the folded-back margin of one of the modified petals. By reason of their greenish-white color, they stood out very strikingly in the flower against the dark-green background. As can be seen, the stamens, normally pollen-bearing apparently, are present. The stamens were in no way abnormal.

The drawings represent in both cases sections of material imbedded in paraffin and cut 15 microns thick. (Fig. 7a.)

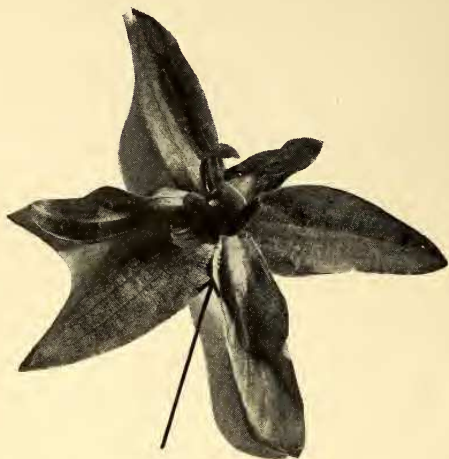


Fig 6. Teratological flower of *T. sessile*, var. *giganteum* H. & A. Three ovules can be seen, at the head of the arrow, borne along the margin of a modified petal.

In the upper drawing is shown a portion of the cross-section of a normally produced ovary of *Trillium*, to show the appearance and structure of the ovules. (Fig. 7b.)

The lower drawing represents a cross-section of one of the modified petals found in the abnormal flower shown in the photograph and described above. This lower drawing is partially reconstruction, since no two ovules on opposite edges of the same modified petal gave exactly similar views in any one section. In both drawings only cell outlines are shown, since the tissue of the abnormal flower was not prepared for sectioning until some days after its collection, and the contents of the cells had, to some extent, degenerated.

As shown in these drawings, the similarity between the structures borne normally within the ovary attached to the placenta and those present along the margins of perianth segments is striking. There seems to be no room for doubt that we are dealing here with a case of pistillody in which the perianth segments of the flower are concerned; that is to say, three segments of the six-parted perianth bear ovules, and thus function in a sense as pistils or better as carpels. It is evident that if these three modified petals were first folded to bring their ovule-bearing margins together and thru all three united along these double edges, a three-celled or three-carpelled structure would be produced that would correspond exactly to

the normal three-celled ovary of *Trillium*. Such pistillody of the perianth is an abnormality of much less common occurrence than a similar modification of the stamens. Masters,¹ however, describes and illustrates a case of pistillody of the perianth in *Tulipa gesneriana*

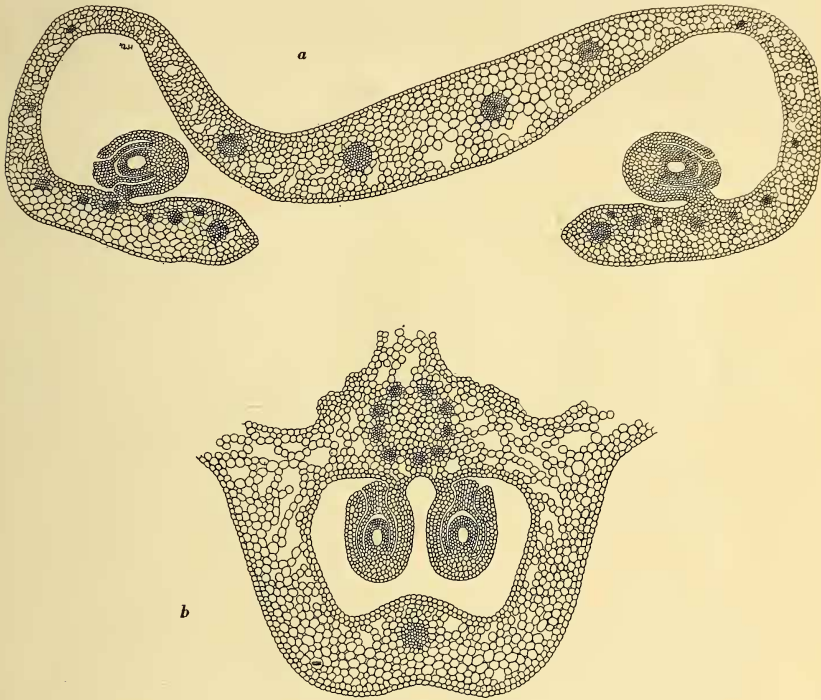


FIG. 7.

- (a) Cross-section through a normally produced and matured ovary of *Trillium sessile*, var. *giganteum* H. & A. The section is taken across the top of the ovary, and the ovules are seen attached to the placental surfaces, which have here grown together to form a seemingly axial placenta. Diagrammatic.
- (b) Cross-section through one of the modified petals of the teratological flower of *T. sessile*, var. *giganteum*. Ovules are here found attached, free, along the margins of a perianth segment.

that strikingly resembles the conditions present in this abnormal flower of *Trillium*. It is to be noted that the ovule-bearing perianth segments of this *Trillium* showed no evidences of any such further modification of their margins to form stigmatic or stylar surfaces,

as in the case of *Crocus nudiflorus* mentioned by Masters,² and quite often the rule in cases of pistillody of the stamens.

The occurrence of floral and vegetative abnormalities in both Eastern and Western species of the genus *Trillium* is frequently mentioned in the literature on the subject. The most complete description and illustration of such abnormalities is that of Britcher,³ in the case of the Eastern *T. grandiflorum*, which the Californian *T. ovatum*, with its pedunculate flowers, resembles. Appended is a partial list of references to the literature dealing with teratology in the genus *Trillium* which may be of interest, as indicating the range of its possible floral and vegetative abnormalities.

This brief note on pistillody in *Trillium sessile*, var. *giganteum*, is presented both for the sake of putting upon record this somewhat unusual floral abnormality, and also in the hope that it may call the attention of the members of the California Botanical Society to what may be a new, and to what cannot fail to be an interesting, objective on their botanical expeditions. There is distinct scientific value in a thorough knowledge and catalogue of cases of teratology exhibited by the California flora, and such knowledge must be accumulated concurrently with the extension of systematic studies throughout the native flora. The California Botanical Society might entertain the suggestion that a secondary aim of their expeditions be the collection of all significant floral and vegetative abnormalities for the herbarium, while this journal might establish a section devoted to the recording of the most interesting cases of teratology.

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¹ Masters, M. T., "Vegetable Teratology," London, 1869.

² Op. cit., p. 302.

³ Britcher, H. W., "Variation in *Trillium grandiflorum*," Maine Agric. Expt. Stat., Bull. 86, Nov., 1902.